Name _____ Class _____ Date _____

Section 24.1 The Study of Light

This section describes the electromagnetic spectrum and how scientists use spectroscopy to study it. It also explains the Doppler effect and how it is used in astronomy.

Reading Strategy

Before you read, predict the meaning of the term *electromagnetic spectrum* and write your definition in the table. After you read, revise your definition if it was incorrect. For more information on this Reading Strategy, see the **Reading and Study Skills** in the **Skills and Reference Handbook** at the end of your textbook.

Vocabulary Term	Before You Read	After You Read
electromagnetic spectrum	a.	b.

1. Why is an understanding of light important to astronomers? _____

_____

_____

Electromagnetic Radiation

2. The arrangement of electromagnetic waves according to their wavelengths and frequencies is called the _____.

3. List the types of energy that make up the electromagnetic spectrum.

_____

_____

_____

4. Is the following sentence true or false? Different electromagnetic waves travel through vacuum at different speeds.

_____

5. Circle the letter of the best description of the nature of light.

a. Light always behaves like waves.

b. Light always behaves like particles.

c. Light sometimes behaves like waves and at other times like particles.

d. Light never behaves like either waves or particles.

6. How can you show that visible light is made up of many different wavelengths?

_____

_____

7. Particles of light are called _____.

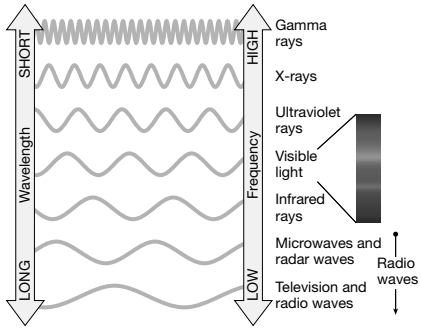
8. According to the figure, how are frequency and wavelength related? _____

_____

9. Circle the letter of the waves in the figure that have the highest frequency.

a. gamma rays b. ultraviolet rays

c. infrared rays d. radio waves



Spectroscopy

Match each description with its spectrum.

Description	Spectrum
_____ **10.** band of color with a series of dark lines running through it	a. absorption spectrum
_____ **11.** uninterrupted band of color	b. emission spectrum
_____ **12.** series of bright lines of particular wavelengths	c. continuous spectrum

13. Spectroscopy is the study of the properties of light that depend on _____.

14. What can a star's spectrum tell astronomers about the star? _____

_____

The Doppler Effect

15. When a wave source is moving toward or away from an object, the wavelength changes, a phenomenon known as the _____.

Match each situation with its type of change in a wave.

Situation	Change in Wave
_____ **16.** sound source approaches an observer	a. pitch becomes lower
_____ **17.** light source moves away from an observer	b. pitch becomes higher
_____ **18.** sound source moves away from an observer	c. light becomes bluer
_____ **19.** light source approaches an observer	d. light becomes redder

20. How is the Doppler effect used in astronomy? _____

_____